WHAT IS CLAIMED IS:

1. A semiconductor manufacturing apparatus comprising:

a silicon thin film formation chamber, an insulating thin film formation chamber, a laser irradiation chamber, a hydrogen annealing chamber and transportation means for transporting a substrate having planar dimensions of a substrate width by a substrate length,

wherein each of said chambers and said transportation means are constituted such that said substrate on which a semiconductor device is formed can be transported among said chambers without exposure of said substrate to the air; and

wherein said laser irradiation chamber includes an irradiation system and a vacuum chamber for accommodating the substrate, wherein the vacuum chamber has planar dimensions of a chamber length and a chamber width wherein at least one of the chamber length and chamber width is less than twice a respective length or width dimension of the substrate.

2. The semiconductor manufacturing apparatus of claim 1, wherein said substrate is held in a stationary position during laser irradiation in said laser irradiation chamber.

- 3. The semiconductor manufacturing apparatus of claim 1, wherein the irradiation system includes a laser and an optical system for shaping the laser beam, wherein a part of said optical system is movably disposed within said vacuum chamber such that the laser beam can be irradiated onto substantially the entire planar area of said substrate.
- 4. The semiconductor manufacturing apparatus of claim 1, wherein the vacuum chamber includes a window, said window having dimensions corresponding to a planar area of said substrate, wherein a laser from said irradiation system is passed over substantially the entire planar area of said substrate through said window.